have been chosen, as long as the combined length of the selected number of adjacently aligned rectangular ends of fiber optic bundles is equal to the physical length of the slit **65**.

The detected outputs of the photomultipliers **78–87** are then applied to a signal conditioner assembly **101** which is comprised of a group of 10 signal conditioners, each being similar in structure and function to the signal conditioner **71**. The signal conditioner assembly **101** passes the high signal frequency components and attenuates the low background frequency components of the outputs of the photomultipliers **78–87**. It should be noted that two of the photomultipliers may look at the bars in the inhibit preamble **17** (FIG. 1) as the mirror drum **55** scans the eflected image of the graphic code past the ends of the fiber optic bundles **89–98**. As a result, one long output at a wrong or lower frequency and one segmented output at a different (which may be higher) frequency are developed by the two photomultipliers. Only the long output from the solid bar in the inhibit preamble **17** is filtered out by its associated signal processor in the assembly **101**. The segmented output developed from the segmented portion of the inhibit preamble **17** is passed by its associated signal processor in the assembly **101** and will be further discussed later.

The high signal frequency components at the output of the assembly **101** are applied through a composite line **102** to a sampling network **103**. The sampling network **103** may be either a serial or a parallel sampler. If a serial sampler were used, it would process the filtered multibit information from the assembly **101** in a serial sequence. A typical example of a serial sampler is the MMUX Series Eight Channel Multiplexer, manufactured by DDC, a division of Solid State Scientific Devices Corp., located in Hicksville, N. Y. If a parallel sampler were used, it would process the filtered multibit information in a parallel sequence as it was received from the assembly **101**. In any event, the multibit output of the sampling network is applied to the code conversion equipment **77**, which performs the desired code conversion from, for example, a binary to a decimal format.

The code conversion equipment **77** is composed of conventional digital processing building blocks well-known in the art which will also enable it to disregard meaningless scans, carry out parity checks, accumulate several sequential scans for redundancy, and perform the decision function of selecting the set of five sensors which actually perform the scanning function on a laterally displaced code. The decoding techniques of the code conversion equipment **77** may be of a conventional type or may be similar to those described in patent application Ser. No. 108,626, filed on Jan. 21, 1971 as a continuation of now abandoned patent application Ser. No. 716,534 filed Mar. 27, 1968.

One way the selection function of the code conversion equipment **77** can be performed is by utilizing the segmented bar of the inhibit preamble **17**. This segmented bar will cause the photomultiplier, which is monitoring it as the mirror drum **55** scans the image, to develop a different frequency of signal components or pulses than that developed by the other photomultipliers in the group of photomultipliers **78–87**. This different frequency component, which is readily passed by its associated signal conditioner in the assembly **101** through the sampling network **103** into the code conversion equipment **77**, tells the code conversion equipment **103** to only use or gate through the next five bits which represent the bits immediately below it, as illustrated in FIG. 1, and to disregard all of the other outputs from the photomultipliers **78–87**. For example, if this different frequency signal is developed from the output of the photomultiplier **85**, the equipment **77** will only use the outputs from the photomultipliers **80** through **84** and will disregard the outputs from the photomultipliers **78, 79, 85, 86** and **87**. It is by this operation that the equipment **77** selects the five photomultipliers which perform the scanning function when the graphic code is laterally displaced. In the case where the imaged column bits straddle two adjacent fiber optic bundles, a preselected threshold level is set by threshold detection circuitry (not shown) in the equipment **77** for the determination of binary 1 and 0 signals entering the code conversion equipment **77**.

The code conversion equipment **77** disregards meaningless scans by only responding to the coded (one long and two short) enable preamble **19** signals developed by the photomultiplier **69** in response to the one wide and two narrow bars and taken from the output of the delay circuit **73**, when the reflected image is properly oriented in a substantially parallel alignment with the slit **65**. It is at this time that the enable preamble activates the code conversion equipment, thereby enabling the equipment to acquire the encoded information from the five photomultipliers of the group **78–87** which are actually performing the scanning functions on the laterally displaced code, as mentioned previously. The code conversion equipment **77** does not respond to any other orientation of the graphic code, as previously discussed.

The output of the code conversion equipment **77** may be applied to a computer **105**, which in turn directs the operation of an output device **107** such as a printer, a display unit or a memory unit.

Referring now to FIGS. **5** and **6**, FIG. **5** illustrates the reflected image of the graphic code being in the proper orientation so that the multibit information contained in one of the columns of the code is focussed through the slit **65** in one dimension, as previously described. FIG. **6** illustrates how the rectangular ends of the illustrated fiber optic bundles **89–98** cover a multibit column so that the bits in the column can be detected by the appropriate ones of the photomultipliers **78–87** in an orthogonal dimension in the manner previously discussed.

The invention thus provides an optical system for reading graphic codes in two dimensions wherein a multibit, multicolumn graphic code is illuminated by a light source and the resultant reflected image of the code is slowly rotated by a K-mirror assembly and rapidly scanned by a rotating mirror drum first past a slit into a photoultiplier for detection in a first dimension and then into an array of photomultipliers where the bits in each of the multibit columns are detected in a second dimension orthogonal to the first dimension.

While the salient features have been illustrated and described it should be readily apparent to those skilled in the art that modifications can be made within the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. An optical system for reading a graphic code positioned within a target area having a first axis extending